Physics S1

Newtonian Physics

Physics S2

Electromagetic Spectra

On your computer:

- Open the Chrome browser
- Go to: myportal.dpsk12.org
- Change your password to: FIlibday or bdayFIli
- Go to: www.google.com
- Login: studentid#@dpsk12.net
- Click SignIn
- Next page, username: studentid#
- Password: what you just changed it to in MyPortal
- Open Gmail & send e-mail to: mmelosh@dpsk12.net, subject: I'm in

Every day <u>each</u> group will need:

- **One physics textbook**
- **One computer**

Each activity includes:

WDYS

WDYT

Investigate

Physics Talk

Checking up

Physics to Go

Chapter 1: Driving the Roads

Chapter Challenge

group demonstration of basic knowlege

2-3 min presentation

Must explain:

- relationships: following distance, braking distance, total stopping distance and factors affecting each
- Connection between speed, friction, and the radius of the curve when turning

graphs / charts

Written paper

2-3 min 10pts, <2min -5, >5min -1/min

relationships/distance 15pts

speed, friction curve 15pts

1 graph/chart 5pts

+1pt / extra graph

submit paper 5pts

50pts

Section 1: Responding to Road Hazards (p. 8)

1/8/14

WDYS **bad accident**, gas spilled, blue car too fast to stop, bunny is not helping w/accident, sharp curve, upside-down ~~orange~~ yellow + ~~yellow~~ orange on top, blue using a lot of friction, in the mountains, blue car driver w/ crazy hair's hat flew off, car fluids on road

WDYT texting, music, actions of other passengers, using a phone, eating, turning to look back, putting on make-up, grooming, staring in mirrors, watching TV, smoking, external distractions, putting on seat belt, Drunk, Stoned, DWI, DUID

I will use multiple methods to measure and describe reaction time.

Section 1: Responding to Road Hazards (p. 8)

I will use multiple methods to measure and describe reaction time. I will do this through team experiments and discussions with my team and the whole class. I will demonstrate my understanding through answering questions in the Physics Talk, Checking Up, and/or Physics to Go.

Investigate:

Method B (10 min)

Reaction Time with Distractions (10 min)

I will use multiple methods to measure and describe reaction time.

Physics Talk (p.12)

Reaction time and distractions

What affects reaction time?

knowing something will happen or surprise
Music, people, cellphones/technology, on-road distr.
sneeze, eating

Other factors affecting reaction time

alcohol, drugs, medicine, fatigue,
age, gender, experience, attentiveness,
personality

I will use multiple methods to measure and describe reaction time.

Exit ticket: Physics to Go #4 (p.19)

Answer in a full sentence.

Ptg #4

1/13/14

What is reaction time and what are some factors that affect it?

The time between when something happens and you react to it.

- Texting
- Grooming
- Talking
- Emotions
- People in the car
- External Distractions
- Sun

Section 3: Average Speed: Following Distance and Models of Motion

1/13/14

WDYS Blue car holding up traffic, driver not watching road, bunny watching, all cars have passengers, cars are not keeping their distance, sail boat not caring about traffic, smoke coming out of the cars, traveling fast, all female drivers

WDYT

Safe following distance: 2 ft or more

depends on speed, curves (sharp), weather

size of vehicle, whether others can see you

Hwy: 6-12 sec, 2 car lengths

Surface: 4-6 sec, 1 car length

I will use multiple methods to measure and describe speed, define and contrast average speed and instantaneous speed, and create and interpret graphs to understand and calculate speed.

Section 3: Average Speed: Following Distance and Models of Motion

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I will do this through team experiments and discussions with my team and the whole class. I will demonstrate my understanding through answering questions in the Physics Talk, Checking Up, and/or Physics to Go.

Investigate:

#1-3, small group (team)

#4-6, whole class

#7-8, small group

$60\ \frac{ft}{s}$ N.

$t = 0.5\ s$

$v_{av} = \frac{d}{t}$

$d = t \cdot v_{av}$

a) $0.5\ s \cdot 60\ \frac{ft}{s} = 30\ ft$

b) 60 ft

c) 25 ft, 50 ft

d) 35 ft, 70 ft

e) > 20 ft

f) $60\ ft / 15\ ft/CL = 4\ CL$

I will use multiple methods to measure and describe speed, define and contrast average speed and instantaneous speed, and create and interpret graphs to understand and calculate speed.

Speed - distance traveled per unit time

time - seconds (s) distance - meters (m)

S.I. - metric

mass - Kilogram (kg)

Constant speed - keeps going at the same rate

average speed - middle (bet. highest & lowest) speed

our typical speed for a time period

instantaneous speed - our exact speed

at the time of measurement

I will use multiple methods to measure and describe speed, define and contrast average speed and instantaneous speed, and create and interpret graphs to understand and calculate speed.

1.3 $v_{av} = \frac{\Delta d}{\Delta t}$ $\frac{d_f - d_i}{t_f - t_i}$ 1/15/14

$\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{\Delta d}{\Delta t}$

Velocity - speed of something in a given direction

Reaction Distance – the distance traveled during the reaction time

I will use multiple methods to measure and describe speed, define and contrast average speed and instantaneous speed, and create and interpret graphs to understand and calculate speed.

Checking Up: #1-4 (p.46)

Physics to Go: #4-7, 12 (pp.49-50)

Mini-challenge
(40 min.)

Look over the requirements for the chapter challenge. As a team, write a paragraph for your challenge relating to the topics covered in sections one and three.

With the remaining time of the 40 minutes, make sure you have updated your individual physics vocabulary resource for the first seven words listed for chapter 1 and any additional new words of which you wish to keep track.

WDYS A guy and his dog are rushing out of the street because some other guy is speeding through the intersection and not paying attention to pedestrians. The old lady is just watching. The yellow car was stop at a green light.

WDYT

Similar: Start at 0mph, reach 30mph, going the same direction, start at same time (green)

Difference: bus pushes w/ 4 wheels, car w/ 2 wheels;
bus has more mass + takes longer
IF downhill, bus accelerates faster than the car
- uphill ; car " " " bus

IWBAT define acceleration using words and an equation; calculate speed, distance, and time using this equation; and interpret distance-time and velocity-time graphs for different types of motion. I will do this through team experiments and discussions with my team and the whole class. I will demonstrate my understanding through answering questions in the Physics Talk, Checking Up, and/or Physics to Go.

Investigate: (p. 52)

1/21/14: Set up to continue Investigate p. 54

IWBAT define acceleration using words and an equation; calculate speed, distance, and time using this equation; and interpret distance-time and velocity-time graphs for different types of motion.

Physics Talk (p.58)

velocity & time
(m/s) (s)

$\frac{v}{t} = a \left(\frac{m/s}{s}\right)$ or (m/s^2)

acceleration – $\frac{v_2 - v_1}{t_2 - t_1} = \frac{\Delta v}{\Delta t} \frac{\frac{m}{s}}{s} = a$

a change in velocity over time

accuracy - how close you are to the target

precision - exact

Vector – magnitude + direction (velocity)

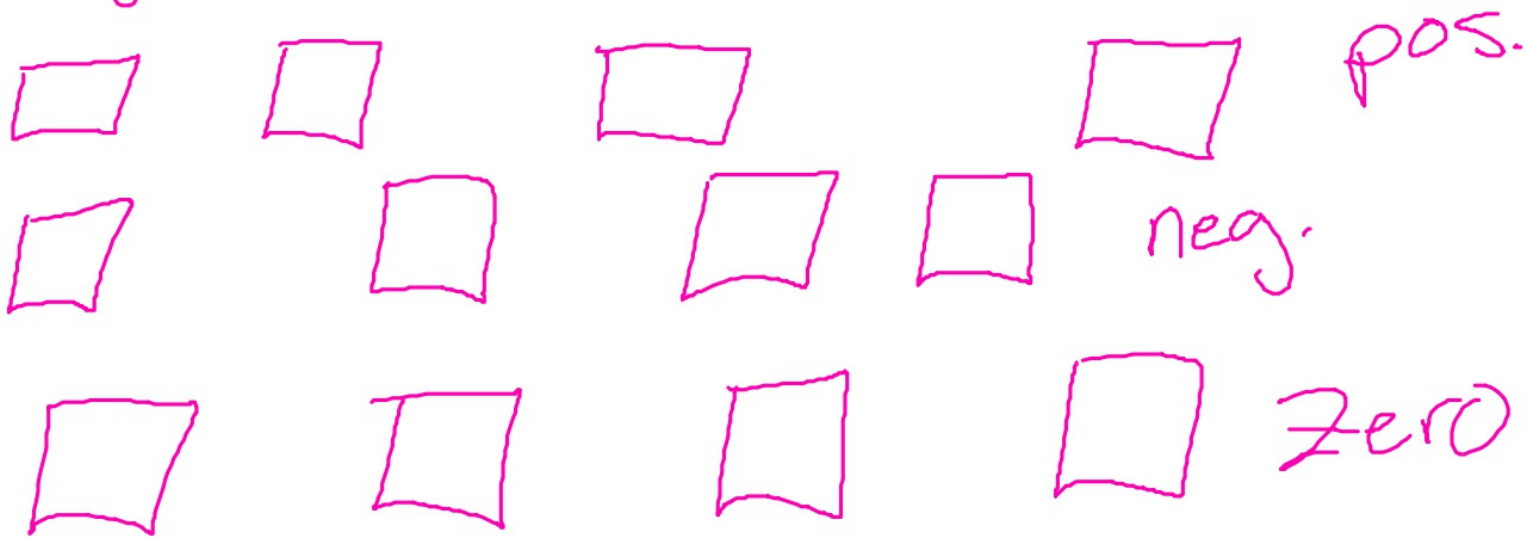
Scalar - magnitude only (speed)

IWBAT define acceleration using words and an equation; calculate speed, distance, and time using this equation; and interpret distance-time and velocity-time graphs for different types of motion.

Physics Talk (p.58)

positive acceleration - goes faster, in direction of travel

negative acceleration - go slower, opposite the direction of travel



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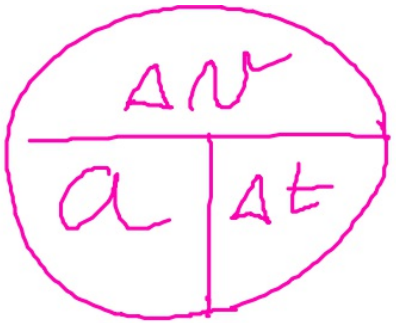
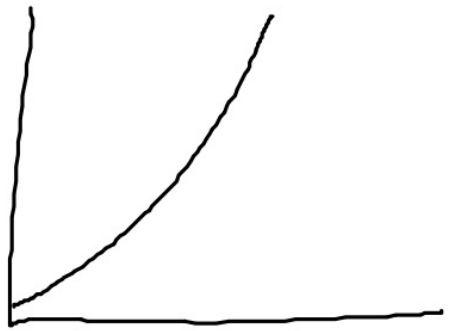




tangent – a line that touches a curve at only one point, but does not cross the curve

d-t = velocity

v-t = acceleration

Checking up (p.64) #1-3
Physics to Go (p.68) #7, 9, 17

$$a = \frac{v_f - v_i}{\Delta t}$$

$$v_{av} = \frac{\Delta d}{\Delta t}$$

IWBAT define acceleration using words and an equation; calculate speed, distance, and time using this equation; and interpret distance-time and velocity-time graphs for different types of motion.

Units

distance	meters	(m)
time	seconds	(s)
velocity	meters/second	(m/s)
acceleration	meters/second/second	(m/s/s or m/s^2)

WDYS The guy is using it's emergency break because the moose was in it's way, trees, Forest beside the road, no reaction time, moose just standing there, car only has two wheels on the ground tires are smoking, Will hit the moose

WDYT

I will plan and carry out an experiment to relate braking distance to initial speed, determine braking distance, and examine acceleration by seeing how varying the initial speed changes the braking distance. I will do this through team experiments and discussions with my team and the whole class. I will demonstrate my understanding through answering questions in the Physics Talk, Checking Up, and/or Physics to Go.

Section 5: Negative Acceleration: 1/23/14
Braking Your Automobile

Investigate p.75

your plan must include :

- Materials needed

- individual jobs (how will things be accomplished ?)

1/27 Complete experiment
1/28 Finalize data recording & create graph (20 min)
Complete section 5

I will plan and carry out an experiment to relate braking distance to initial speed, determine braking distance, and examine acceleration by seeing how varying the initial speed changes the braking distance.

Section 5: Negative Acceleration: Braking Your Automobile

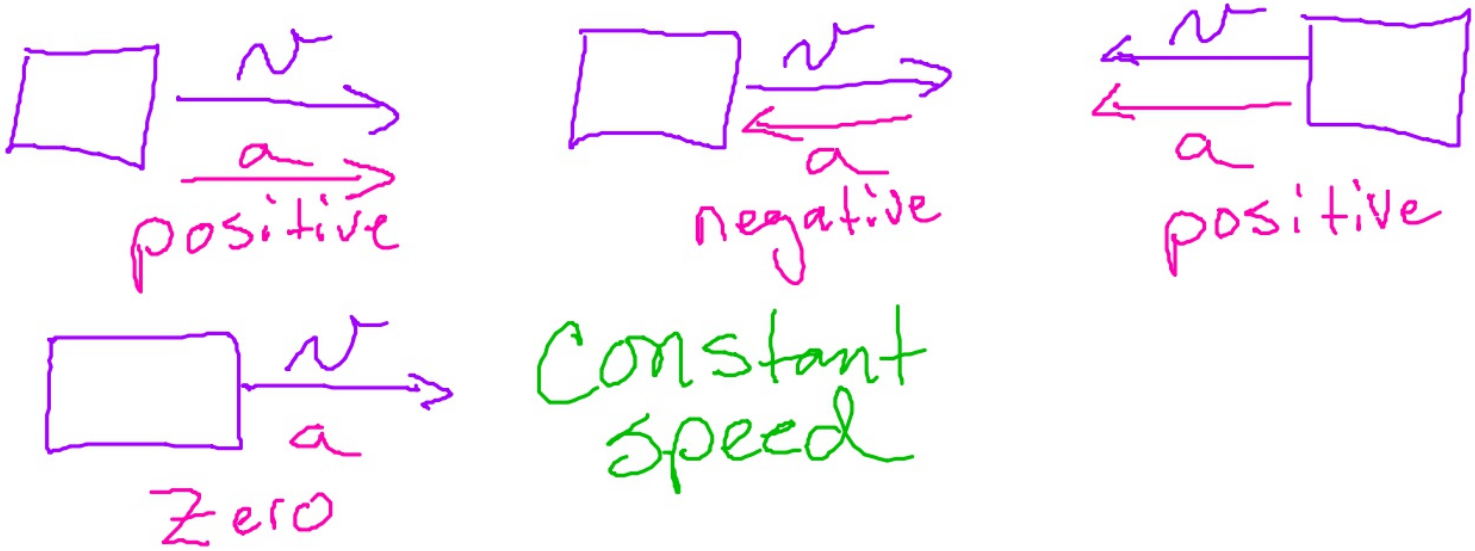
1/28/14

Physics Talk (p.78)

Initial velocity – starting velocity

Braking distance – How far it takes the car to stop

$$a = \frac{\Delta v}{\Delta t} = \frac{v_f - v_i}{\Delta t} = \frac{0 - v_i}{\Delta t} = \frac{-v_i}{\Delta t}$$



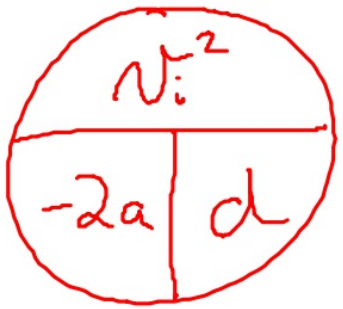
I will plan and carry out an experiment to relate braking distance to initial speed, determine braking distance, and examine acceleration by seeing how varying the initial speed changes the braking distance.

Calculating Braking Distance

$$v_f^2 = 2ad + v_i^2$$

$$0 = 2ad + v_i^2$$

$$v_i^2 = -2ad$$



kilo = 1,000

$$\frac{60\,s}{\cancel{min}} \times \frac{60\,\cancel{min}}{h} = 3600\,\frac{s}{h}$$

$$\left(10.8\,\frac{km}{h}\right)^2 = -2a(4.75m)$$

$$\left(10{,}800\,\frac{m}{h}\right)^2 = -2a(4.75m)$$

$$\frac{\left(\frac{10{,}800}{3{,}600}\,\frac{m}{s}\right)^2}{-2(4.75m)} = \frac{3\ \frac{m^2}{s^2}}{-9.5\,\cancel{m}} = -0.32\,\frac{m}{s^2}$$

Section 5: Negative Acceleration: Braking Your Automobile

1/28/14

Checking up (p.82) #1-3
Physics to Go (p.88) #2 & 11

I will plan and carry out an experiment to relate braking distance to initial speed, determine braking distance, and examine acceleration by seeing how varying the initial speed changes the braking distance.

WDYS There's a person speeding around a curve; only on 2 wheels; there's more traffic ahead; they're in the mountains, rocks falling; he's causing rocks to fall by hitting them; he hit the sign & it's wrinkled and falling; speeding caused him to drive on the wrong side of the road

WDYT The amount of speed you have affects how you turn in the curve (control); how much arch there is in the curve; visibility around the curve

Location of the curve; driveways + visibility; how much arch there is in the curve; how much traffic; typical weather conditions; size of road; one-way vs. two-way traffic; bridges; road materials

IWBAT recognize the need for centripetal force when rounding a curve, predict the effect of inadequate centripetal force, and relate speed to centripetal force. I will do this through team experiments and discussions with my team and the whole class. I will demonstrate my understanding through answering questions in the Physics Talk, Checking Up, and/or Physics to Go.

Investigate (p. 105)

There are three stations.

Each team should start at a different station.

- Turntable
- Car on string
- Cork accelerometer

1/31/2014 Complete the investigation on which you were working at the conclusion of Thursday's class. You should have results for all three investigations listed above. (20 min)

IWBAT recognize the need for centripetal force when rounding a curve, predict the effect of inadequate centripetal force, and relate speed to centripetal force.

Section 7: Centripetal Force

2/3/14

Physics Talk (p.109)

Circular motion

force - a push or pull

Centripetal force – a force towards the center of a circle

Newton's First Law of Motion - an object in motion will stay in motion in a straight line at a constant velocity

If an object's path is acting upon it.

Friction applies the centripetal force on a car.

Gravity applies centripetal force to the earth.

IWBAT recognize the need for centripetal force when rounding a curve, predict the effect of inadequate centripetal force, and relate speed to centripetal force.

Speed remains the same, but the velocity changes because the car's direction changed. Therefore the car accelerated.

Acceleration caused by changing direction is Centripetal acceleration.

IWBAT recognize the need for centripetal force when rounding a curve, predict the effect of inadequate centripetal force, and relate speed to centripetal force.

Checking Up (p. 110) #1-3, 6
Physics to Go (pp. 114-115) #3, 4, 7, 9, 12, 13

IWBAT recognize the need for centripetal force when rounding a curve, predict the effect of inadequate centripetal force, and relate speed to centripetal force.

Chapter 1: Driving the Roads
Chapter Challenge (pp. 118-121)

2/4/14

group demonstration of basic knowlege
2-3 min presentation
must explain:
- relationships: following distance, braking distance, total stopping distance and factors affecting each
- connection between speed, friction, and the radius of the curve when turning

graphs / charts
Written paper

2-3 min 10pts, <2min -5, >5min -1/min
relationships/distance 15pts
speed, friction curve 15pts
1 graph/chart 5pts
+1pt / extra graph
submit paper 5pts

50 pts

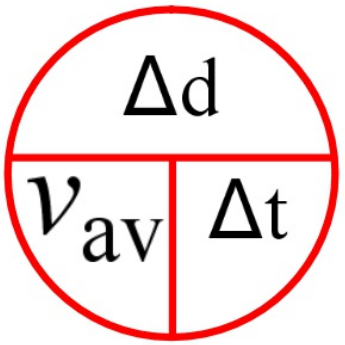
Chapter 1: Driving the Roads

2/4/14

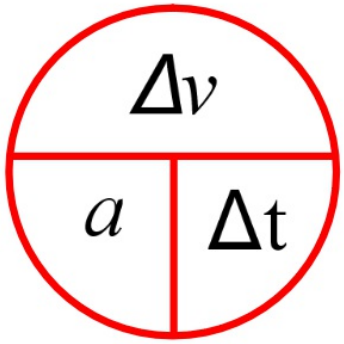
Due Wednesday, 2/5/14

- Chapter Challenge presentation (team)
- Chapter 1 vocabulary (individual)
- Chapter 1 WDYS/WDYT (individual)
- Chapter 1 notebook (team)

$$v_{av} = \frac{(v_1 + v_2)}{2} \qquad v_{av} = \frac{\Delta d}{\Delta t}$$



$$a = \frac{\Delta v}{\Delta t}$$



$$d = \frac{v_i^2}{2a}$$